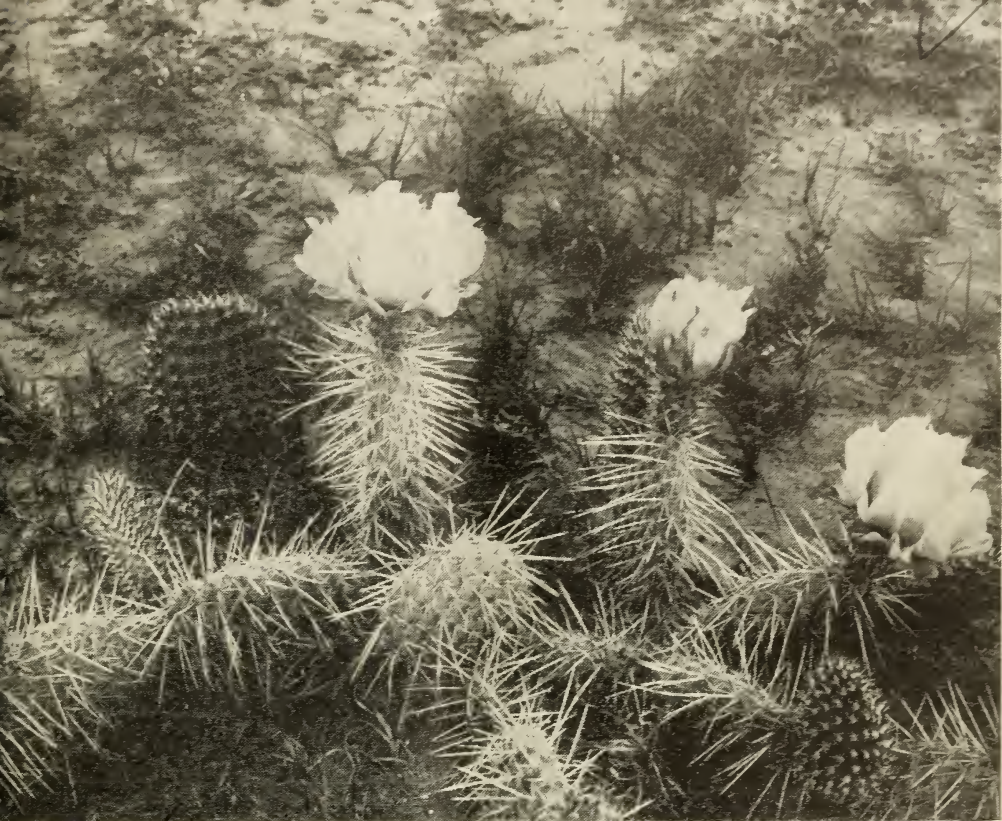


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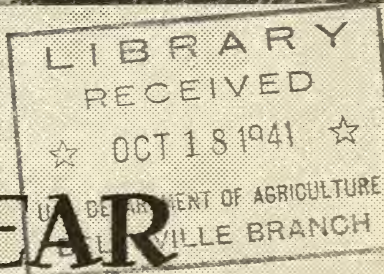
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# PRICKLY PEAR CONTROL

ON SHORT-GRASS RANGE  
IN THE CENTRAL GREAT PLAINS



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# Pricklypear Control on Short-grass Range in the Central Great Plains

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MORE than 5 million acres of range lands in eastern Colorado and eastern Wyoming alone are infested by pricklypear (*Opuntia polyacantha*) to a degree that presents serious problems in range management. This plant has always been present in the central Great Plains, but in recent years it has increased on areas previously infested and has spread to many thousands of acres for the first time.

The pricklypear problem is primarily one of grazing capacity. Not only do the plant's sharp spines prevent the utilization of the cactus by livestock, but also by occupying space where grasses could grow and by keeping livestock from the grasses and other forage plants which grow within the cactus clumps, pricklypear reduces the total amount of forage available. Furthermore, observations indicate that pricklypear not only can withstand drought but can compete successfully with native grasses in favorable years. The only promise of relief from these infestations lies in some method of removal which can be applied effectively and economically.

Pricklypear control has been studied rather extensively in the Southwest,<sup>2</sup> and in Kansas, but on short-grass ranges in the central Great Plains methods of controlling pricklypear have received little attention until recently.

In 1936 and 1937 the relative effectiveness and cost of three recognized methods of pricklypear control was tested experimentally on two areas near Briggsdale in northeastern Colorado, on a Weld County land use adjustment project on which the Soil Conservation Service and the Forest Service are conducting cooperative studies. The methods tested were hand grubbing, dragging with a railroad iron (commonly known as railing), and scraping with a road grader. It is the purpose of this leaflet to report the results of these tests for the benefit of farm and ranch operators who are troubled with cactus infestations.

<sup>1</sup> The author wishes to acknowledge his indebtedness to J. Russell Penny, formerly of the Resettlement Administration, who developed the plan for studying methods of plains pricklypear control; and to Hubert D. Burke, Rocky Mountain Forest and Range Experiment Station, for supervising the control treatments in 1937. Treatments were applied in cooperation with the Resettlement Administration.

<sup>2</sup> In the Edwards Plateau section of Texas, grubbing and piling various species, at costs varying from 25 cents to \$3 per acre, was found to be a practical and effective method; poisoning was effective, but too costly. (DAMERON, W. H., and SMITH, H. P. PRICKLY PEAR ERADICATION AND CONTROL. Texas Agr. Expt. Sta. Bul. 575, 55 pp., illus. 1939. TIMMONS, F. L., and WENGER, L. E. JACK RABBITS AND CACTUS TEAM UP; PRESENT SERIOUS PROBLEM IN 30 COUNTIES. Kansas Farmer 77 (8): 5, 22. 1940.)

## WHERE CONTROL IS JUSTIFIED

Pricklypear control is generally desirable wherever it can be accomplished without harm to the range and without prohibitive cost. Usually it can be justified under the following conditions:

1. Where the grass cover is sufficiently dense to prevent soil erosion after the cactus is removed.
2. Where light stands of cactus are increasing in density and causing infestations on surrounding areas.
3. When a trial of the most desirable control methods has demonstrated that it is economically feasible under specific farm or ranch conditions.

Pricklypear control is undesirable and should not be attempted under the following conditions:

1. Where appreciable soil erosion either by wind or water is likely to follow the operation. This prohibits the use of a road grader on hummocky areas.
2. On badly depleted ranges supporting so little grass that both soil erosion and reinfestation of cactus may occur after the control measures are applied.
3. On any range where no provision is made for proper grazing control following treatment. A reduction in stocking rate of 30 to 50 percent below estimated grazing capacity for at least 2 years following removal of the cactus is essential as a means of encouraging the spread of the grasses and of reducing the opportunities for reinfestation by cactus.

## THE PRICKLYPEAR PLANT

This flat-stemmed or flat-jointed species of cactus (cover illustration) is characterized by branched stems, both prostrate and erect, and varies in height from 6 to 18 inches. It has a shallow but widespread root system, which usually dies out after the stems are detached. It is commonly found in dense patches from British Columbia and Saskatchewan eastward to Wisconsin, southward to Missouri, and westward to New Mexico and Arizona. The plant is most abundant in the Great Plains area of northern New Mexico, eastern Colorado, eastern Wyoming, western Kansas, and western Nebraska and is common on lands which are characterized by short-grass vegetation, particularly blue grama (*Bouteloua gracilis*) and buffalo-grass (*Buchloe dactyloides*).

One of the chief difficulties in control of this pest lies in its remarkable powers of vegetative reproduction. Reproduction from seed, which may be blown considerable distances by the wind, is negligible on ranges where the grass cover is well developed. Vegetative reproduction, in addition to development from underground buds on the widespread root system, results from the formation of roots by the stem joints wherever they come in contact with the soil. These stem joints are easily broken off by the trampling of livestock and may take root even after 1 or 2 years. Any method of eradication which leaves on the ground a residue of broken stem joints is sure to result in a considerable stand of reproduction.

## ERADICATION AND CONTROL METHODS

### GRUBBING

Grubbing with shovels to a depth of 2 to 4 inches results in complete detachment of almost all pricklypear stems (fig. 1). The shallow root

system need not be removed. If the plants are hauled from the area promptly after grubbing, practically no regrowth occurs. If they are piled, very few plants in the pile survive to take root. New plants that may appear 2 and 3 years later where plants have been grubbed and removed or piled result largely from seeds present at the time of treatment or brought in from surrounding areas. They will be few, scattered, and easily removable.

If, however, pricklypear plants grubbed in any season of the year are left scattered on the ground they may remain green for many months and root abundantly. Three years after treatment on areas where the grubbed stems have been left scattered, the stands of cactus are as dense as before grubbing.

The cost and time required for grubbing are influenced by the density of the pricklypear stand. Light infestations (10 percent of the plant density



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FIGURE 1.—Grubbing pricklypear with a shovel. The plants detached are either piled and left or hauled off in trucks. The most effective method for light stands.

or less) can be grubbed and hauled at a cost of \$1 to \$3 per acre if 30 cents per man-hour is paid for labor and 10 cents per mile for truck rental. Eradication of moderate to heavy infestations may cost \$5 to \$10 per acre. One man can grub from  $\frac{1}{3}$  of an acre to more than 5 acres per day, depending on the density of the stand.

In hauling, the plants may easily be disposed of by piling them at the edge of the field from which they have been grubbed. In years when the need for forage is critical the cactus spines may be singed with a blowtorch and the grubbed plants used as feed for livestock.

The hauling cost may be eliminated in light, or even moderate stands by gathering the grubbed plants with an ordinary pitchfork and piling them at intervals. The few survivors in such piles or those scattered by wind or livestock, if they take root, may be removed without difficulty.

The cost of grubbing and piling is 50 cents to \$1.50 per acre. In fairly heavy stands piling is possible but does not reduce the cost greatly over hauling and requires subsequent inspection and clean-up effort.

### GRADING

A road grader pulled by a tractor will remove more than 95 percent of the cactus and approaches grubbing in efficiency. The grader is, of course, much faster than the hand method, requiring only 20 to 30 minutes per acre. This method has an additional advantage in that it leaves the plants in windrows, from which they may readily be piled or loaded and hauled away (fig. 2). The average expenditure for complete removal of cactus by the grader method, as determined in the experimental work, was \$1.82 per acre, \$1.07 of which went for piling and hauling.



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FIGURE 2.—Removing pricklypear with a road grader. The cactus is piled in windrows, facilitating removal from the range. Particularly useful in heavy stands.

Complete removal is most desirable, since it greatly reduces the labor involved later in the clean-up campaign. The windrows can be raked together into compact piles, however, where the plants will not be likely to take root. If the cactus is left in windrows some of the plants will take root, and it will generally be necessary to turn the windrows with the grader one or two seasons later.

The road grader is especially recommended for heavy infestations, since the time required for grading is not materially influenced by the density of cactus or the volume produced. Grading is considerably more severe on the grass cover and indirectly on the grazing capacity than either grubbing or railing. As already stated, it cannot be used on hummocky ground without serious subsequent damage. The grader blade should be set to scrape the surface of the ground very lightly, in order to remove most of

the cactus with a minimum of the sod. The most desirable angle of the blade must be determined by trial. Regardless of the setting of the grader blade, however, a certain amount of grass and most of the shrubby species will be removed. On areas that were graded near Briggsdale, Colo., from 20 to 40 percent of the grass cover was removed. Within 2 years, however, the grass density had returned to normal and no reduction of the grazing capacity of the range was apparent. Where this method has been used, very conservative grazing is essential until the grass recuperates.

### RAILING

Eradication of pricklypear by means of a 15-foot railroad iron pulled behind a tractor (fig. 3) was the least efficient of all the methods tried. The rail is fitted with an iron shoe at each end to hold it upright and to permit the flange to pass under the cactus lobes.



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Figure 3.—Removing pricklypear by railing. An iron shoe at each end holds the rail upright. This is a fairly satisfactory method on smooth ground.

On the level ground the rail removed 90 percent or more of the plants but on rough hummocky ground only 40 to 60 percent. The plants are scattered by this treatment instead of being left in windrows, and even after so short a period as 3 years the stand may show greater density than adjacent untreated areas. Railing without hauling or piling, therefore, although inexpensive and involving only tractor rental and the wages of the operator, is worse than useless. Clearing the pricklypears with a hay rake drawn by tractor or horses generally leaves so many stem joints on the ground that the plants reestablish themselves within 1 or 2 years. Piling the scattered plants is practicable but somewhat more costly than with the other two methods.

The average cost for railing alone in these experiments, including railing in opposite directions over the same ground, was 24 cents per acre. In light to medium stands, the cost of piling railed cactus with hand rakes and shovels will vary from 50 cents to \$2 per acre, if the labor rate is 30 cents

per hour; in heavy to very dense stands the cost may even exceed \$5 per acre if all the broken and disjointed cactus stems are cleared away. Hauling the plants off the range after they have been railed and piled will require an additional expenditure of 20 to 90 cents per acre. Total cost per acre for railing, piling, and hauling cactus, except in heavy stands, will range from \$1 to approximately \$3.25.

Railing should never be attempted unless the ground surface is fairly smooth and provision is made for collecting the cactus in piles or hauling it off the range. Even with piling or hauling included, railing is not so effective a method as either grubbing or grading.

### CONSIDERATIONS IN CHOICE OF METHOD

The choice of method of control should depend upon the density of cactus to be removed and the labor and equipment available. Grubbing of light stands, where the pricklypear density does not exceed 10 percent of the total plant density, is more economical than grading. Stands in which pricklypear exceeds 10 percent of the total vegetation cover will generally require an expenditure greater than \$3 per acre for grubbing alone, whereas grading and hauling can be accomplished at a cost of not more than \$2 per acre. If idle labor is available, grubbing and piling is more practical than any other method, since no equipment rental is involved.

On farms and small ranches pricklypear control usually should be considered as a spare-time operation. The time or season of treatment is of little consequence if a method is used that removes the entire plant and does not leave the stems scattered over the ground where they may take root and continue to grow. The ranch operator who employs workmen on a monthly or yearly basis and occasionally is faced with the necessity of finding spare-time work for these employees might profitably consider pricklypear control as a part of his improvement program and considerably reduce the cost of removal thereby. Costs may be reduced also if tractors, trucks, and other equipment are available.

The manner of disposal of the plants following clearing depends upon the cost of labor involved and the method of clearing used. If pricklypear is grubbed with idle labor, it is of course desirable to haul the plants away and thus avoid any possibility of detached stems taking root. In stands where the cactus density exceed 10 to 15 percent of the total plant density and the labor of hauling becomes excessive but hand labor is cheap, piling is recommended. When this procedure is followed the piles should be inspected at least once each year for 2 or 3 years and any plants which have taken root should be grubbed out.

A clean-up campaign by grubbing within 1 or 2 years following treatment by any method is essential. Otherwise occasional plants, which will always be missed irrespective of the method used, will serve as new sources of infestation. The clean-up campaign should include the removal also of any seedlings that may appear from year to year.

At all events, pricklypear eradication should not be attempted unless adequate provision for proper grazing control following treatment has been made. Where the cactus has served as a protection for seed-producing plants and possibly for the only vigorous grasses remaining on the range the removal of pricklypear without subsequent grazing regulation may easily lead to more serious range depletion.



